

# **SUBCOMMITTEE ON CONSEQUENCE ASSESSMENT AND PROTECTIVE ACTIONS (SCAPA)**

## **2006 ANNUAL REPORT**

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**January 2007**

## **2006 SCAPA Annual Report**

### **1.0 Introduction**

### **2.0 Annual Meeting and Teleconferences**

### **3.0 Working Group Accomplishments**

3.1 Chemical Exposures WG

3.2 Chemical Mixtures WG

3.3 Consequence Assessment Modeling WG

3.4 Biosafety WG

3.5 Source Term WG

### **4.0 Web Page**

### **5.0 Action Items**

### **6.0 2006 Activities and Priorities**

6.1 Chemical Exposures WG

6.2 Chemical Mixtures WG

6.3 Consequence Assessment Modeling WG

6.4 Biosafety WG

6.5 Source Term WG

6.6 Web Page

### **7.0 Conclusion**

### **8.0 Acronyms**

## **1.0 Introduction**

This compilation of information represents the second annual report of the programs associated with the Subcommittee for Consequence Assessment and Protective Actions (SCAPA). Annual reports, describing the SCAPA activities, will be prepared each year the program is active.

The following presents the SCAPA Charter:

### **Background**

The Comprehensive Emergency Management System (CEMS) of the Department of Energy/National Nuclear Security Administration (DOE/NNSA) provides the overall framework for responding to all emergency events involving or affecting the Department. The CEMS is defined by the requirements of DOE Order 151.1C Comprehensive Emergency Management System and the associated Emergency Management Guide. The development of this order and the associated guidance has been an iterative process. The Subcommittee on Consequence Assessment and Protective Actions (SCAPA) was created as an integral part of this process to provide recommendations on emergency management issues to the Office of Emergency Management and developing guidance and products for use in the CEMS. The purpose of the EMI SIG is to foster the exchange of information, ideas, resources, and products of interest within the DOE/NNSA emergency management community. After years of operating as a part of the Emergency Management Advisory Committee, SCAPA is now a subcommittee of the Training Resource and Data Exchange (TRADE) Emergency Management Issues Special Interest Group (EMI SIG).

### **Mission Statement**

The SCAPA supports the Office of Emergency Management by developing and disseminating throughout the DOE community technical guidance, recommendations, and resources to improve emergency preparedness, consequence assessment capabilities, and the formulation of protective actions. The goal of the SCAPA is to enhance the ability of the DOE emergency preparedness and response community to protect the health and safety of workers, members of the public and ecological resources in the event of the release to the environment of any hazardous radiological, chemical, or biological materials.

### **Membership and Organizational Structure**

The SCAPA is composed of Federal employees and contractors from a wide spectrum of DOE/NNSA facilities. SCAPA membership is open to DOE and contractor personnel who are doing emergency response and planning work for the DOE or are doing technical work that has applications to emergency response and planning. Membership in the SCAPA is voluntary and is also extended to other Federal agencies having a need to participate.

The SCAPA Chair is a Federal employee or contractor appointed by the Office of Emergency Management. The subcommittee is supported by working groups specializing in selected topics or elements within the CEMS. Membership in working groups is determined by the SCAPA Chair. Selection is based on experience and expertise relevant to the specific focus of each working group.

SCAPA decisions concerning topics of interest is made with a simple majority vote of the full subcommittee during a regularly scheduled meeting or during a virtual meeting (e.g., a conference call or video conference), or by written or electronic balloting.

### **Objectives and Functions**

The objectives and functions of SCAPA are:

- To review relevant requirements for emergency preparedness and response aspects of consequence assessment and protective actions, and to review relevant requirements for other areas of emergency management;
- To identify additional requirements or the need for specific implementing guidance;
- To develop or review implementing guidance and recommendations of special concern to the Office of Emergency Management—for example, Emergency Response Planning Guidelines, Acute Exposure Guideline Levels, Temporary Emergency Exposure Limits, methodologies for dealing with chemical mixtures, and Protective Action Guidance;
- To provide guidance on the development, deployment, and implementation of consequence assessment models;
- To identify or develop research needs or issues related to improvements in emergency management of biological, chemical, and nuclear operational emergencies;
- To perform specific reviews and provide technical recommendations as requested by the Office of Emergency Management or the EMI SIG;
- To provide an information-sharing forum to promote consistency throughout the DOE/NNSA for the emergency management of releases of hazardous materials; and,
- To provide a source of expertise in planning for responses to nuclear, biological, and chemical hazardous materials emergencies – This may involve the consideration of incidents involving inadvertent releases, terrorist activities, the use of weapons of mass destruction, natural disasters, and other events.

## **Meetings**

Meetings are held in conjunction with the annual EMI SIG meeting, the first full week in May. Additional meetings (e.g., via conference calls or video-teleconferences) is arranged by the Office of Emergency Management (OEM), as needed. Following each meeting, succinct minutes, including issues identified, is developed and submitted by the Chair to the OEM within 20 working days. Approved minutes are posted on the web page.

## **2.0 Annual Meeting and Teleconferences**

### **Annual Meeting**

The Department of Energy (DOE) Subcommittee on Consequence Assessment and Protective Actions (SCAPA) convened its annual meeting at the Renaissance Hotel in Las Vegas, NV, on Thursday, May 4, 2006, in conjunction with the Emergency Management Issues Special Interest Group (EMI SIG) meeting. Forty-four (44) individuals from the public and private sectors participated in this year's SCAPA meeting.

The primary purpose of the annual SCAPA meeting was to continue to provide a forum for SCAPA members and its associates to review its accomplishments, products, and projects since the last SCAPA meeting on May 5, 2005 in New Orleans, LA, and to also discuss its present and future mission and its implementation. Several technical presentations of interest to the membership, including those from the now five active SCAPA Working Groups, were delivered.

Dr. Al Feldt, NA-41 SCAPA Federal Official, welcomed everyone, and spoke briefly for Jim Fairobent indicating that SCAPA was a very viable part of NA-41 and will continue to be funded. Carl Mazzola reviewed the important points that were discussed and decisions that were made during the 2005 SCAPA Meeting and briefly discussed the report on the New Orleans, LA SCAPA meeting. Carl reviewed the status of the open action items and their proposed disposition.

Carl Mazzola recapped the meeting, reviewed the action items, and indicated when the next SCAPA meeting will be conducted. There were no new action items identified during the meeting. All existing action items will be periodically reviewed by NA-41 through future conference calls. Each WG will report on its activities at the next SCAPA meeting which is scheduled in conjunction with the next EMI SIG meeting. This meeting will be held in San Antonio, TX on May 10, 2007.

Listed below are the forty-four (44) individuals that attended the 2006 SCAPA Meeting:

| <b>Last</b>  | <b>First</b> | <b>Company</b>   | <b>E-mail Address</b>  |
|--------------|--------------|--|--|
| Addis        | Rob          | Savannah River National Laboratory (SRNL)                                    | <a href="mailto:Robert.addis@srnl.gov">Robert.addis@srnl.gov</a>         |
| Baker        | Michele      | Washington Safety Management Solutions (WSMS)-Mid-America                    | <a href="mailto:Michele.baker@wsms.com">Michele.baker@wsms.com</a>       |
| Baskett      | Ron          | NARAC  | <a href="mailto:Ron.baskett@lnl.gov">Ron.baskett@lnl.gov</a>             |
| Brizes       | Cindy        | DOE/Savannah River Operations Office (SROO)                                  | <a href="mailto:Cindy.brizes@srs.gov">Cindy.brizes@srs.gov</a>           |
| Cabrilla     | Dennis       | DOE/Nuclear Energy (NE)  |  |
| Campbell     | Larry        | Fluor-Hanford  | <a href="mailto:Larry.R.Campbell@rl.gov">Larry.R.Campbell@rl.gov</a>     |
| Cheng        | Jeng         | NA-41  | <a href="mailto:Jeng.chang@nnsa.doe.gov">Jeng.chang@nnsa.doe.gov</a>     |
| Craig        | Doug         | Advanced Technology Laboratories (ATL) International                         | <a href="mailto:cragdk@earthlink.net">cragdk@earthlink.net</a>           |
| Davis        | Richard      | Westinghouse Savannah River Company (WSRC)                                   | <a href="mailto:Richard.davis@srs.gov">Richard.davis@srs.gov</a>         |
| Davis        | Wayne        | WSMS-Aiken   | <a href="mailto:Wayne.davis@wsms.com">Wayne.davis@wsms.com</a>           |
| Feldt        | Al           | NA-41  | <a href="mailto:Al.feldt@nnsa.doe.gov">Al.feldt@nnsa.doe.gov</a>         |
| Freshwater   | Dave         | Science Applications International Corporation (SAIC)                        |  |
| Froh         | Bill         | NA-41  | <a href="mailto:Bill.froh@nnsa.doe.gov">Bill.froh@nnsa.doe.gov</a>       |
| Glantz       | Cliff        | Pacific Northwest National Laboratory (PNNL)                                 | <a href="mailto:Cliff.glantz@pnl.gov">Cliff.glantz@pnl.gov</a>           |
| Haggard      | Courtney     | WSMS-Mid-America   |  |
| Harr         | Ernie        | ATL International  | <a href="mailto:echarr@atlintl.com">echarr@atlintl.com</a>               |
| Heitkamp     | Michael      | SRNL   |  |
| Hickey       | Eva          | PNNL   | <a href="mailto:Eva.hickey@pnl.gov">Eva.hickey@pnl.gov</a>               |
| Hughes       | Earl         | DOE/EH-21  |  |
| Hunter       | Chuck        | SRNL   | <a href="mailto:Chuck.hunter@srnl.gov">Chuck.hunter@srnl.gov</a>         |
| Jamison      | Jim          | SAIC   | <a href="mailto:Jamisonj@saic.com">Jamisonj@saic.com</a>                 |
| Lu           | Po-Yung      | Oak Ridge National Laboratory (ORNL)   | <a href="mailto:lupy@ornl.gov">lupy@ornl.gov</a>                         |
| Manis        | Lori         | ORNL   |  |
| Martin       | Greg         | SAIC   | <a href="mailto:martingr@saic.gov">martingr@saic.gov</a>                 |
| Mazzola      | Carl         | Shaw Environmental, Incorporated (SEI)                                       | <a href="mailto:Carl.mazzola@shawgrp.com">Carl.mazzola@shawgrp.com</a>   |
| Merrick      | John         | DOE/SR   | <a href="mailto:John.merrick@srs.gov">John.merrick@srs.gov</a>           |
| Miller       | Mark         | NOAA Hazmat  | <a href="mailto:Mark.miller@noaa.gov">Mark.miller@noaa.gov</a>           |
| Nasstrom     | John         | NARAC  | <a href="mailto:John.nasstrom@lnl.gov">John.nasstrom@lnl.gov</a>         |
| O'Keeffe     | Michael      | Bechtel-Nevada   |  |
| Petrocchi    | Rocky        | Washington Group International (WGI)   | <a href="mailto:rocky.petrocchi@wgint.com">rocky.petrocchi@wgint.com</a> |
| Possidente   | Bill         | Bechtel-Nevada   |  |
| Powers       | Jim          | NA-41  | <a href="mailto:jim.powers@nnsa.doe.gov">jim.powers@nnsa.doe.gov</a>     |
| Rishel       | Jeremy       | PNNL   | <a href="mailto:Jeremy.rishel@pnl.gov">Jeremy.rishel@pnl.gov</a>         |
| Roberto      | Frank        | Idaho National Laboratory (INL)  |  |
| Rotella      | Tom          | NA-41  | <a href="mailto:Tom.rotella@nnsa.doe.gov">Tom.rotella@nnsa.doe.gov</a>   |
| Sabnis       | Amishi       | ATL International  | <a href="mailto:asabnis@atlintl.com">asabnis@atlintl.com</a>             |
| San Augustan | Jesus        | DOE/SP-43  |  |
| Schalk       | Walt         | Air Resources Laboratory Special Operations and Research Division (ARL-SORD) | <a href="mailto:Schalk@nv.doe.gov">Schalk@nv.doe.gov</a>                 |
| Shaw         | Susan        | NA-41  | <a href="mailto:Susan.shaw@nnsa.doe.gov">Susan.shaw@nnsa.doe.gov</a>     |
| Thomas       | Richard      | Intercet   | <a href="mailto:rthomas@intercet.com">rthomas@intercet.com</a>           |
| Tuccinardi   | Tom          | ATL International  | <a href="mailto:ttuccinardi@adelphia.net">ttuccinardi@adelphia.net</a>   |
| Ward         | Kerry        | INL  |  |
| Weeks        | Jim          | ATL International  | <a href="mailto:jweeks@atlintl.com">jweeks@atlintl.com</a>               |
| Winner       | Gary         | Argonne National Laboratory (ANL)  |  |

A meeting report was developed and can be accessed at the following address:  
<http://www.ornl.gov/emi/scapa/Meeting-2006/meetinghighlights.htm>.

## **Teleconferences**

Seven (7) SCAPA teleconferences took place in 2006 in order to maintain continuity of the program activities. Highlights were prepared and they can be accessed under the *SCAPA Teleconference Highlights* heading at the following web address:

<http://www.ornl.gov/emi/scapa/news.htm>. These teleconferences took place on the following dates in 2006:

- January 11: 17 individuals took part;
- February 22: 26 individuals took part;
- March 28: 23 individuals took part;
- June 20: 23 individuals took part;
- July 26: 19 individuals took part;
- August 30: 21 individuals took part; and,
- November 1: 33 individuals took part.

Fifty-four (54) different individuals participated in at least one of the SCAPA teleconferences. They include:

- Denny Armstrong, LANL
- Steve Arnold, TPMC-Portsmouth
- Tom Bellinger, BWXT Y-12
- Cindy Brizes, SRS
- Larry Campbell, Fluor Hanford
- Jeng Cheng, NA-41
- Dorothy Cohen, ORISE
- Bob Cornish, OST
- Doug Craig, ATL
- Wayne Davis, WSMS
- Al Feldt, NA-41
- Pat Frankovich, ANL
- Dave Freshwater, SAIC
- Jerry Gibeault, INL
- Cliff Glantz, PNNL
- Courtney Haggard, WSMS
- Jim Hardy, Connecticut Department of Homeland Security
- Ernie Harr, ATL
- John Harris, OROO
- Eva Hickey, PNNL
- Earl Hughes, DOE/EH-21
- Chuck Hunter, SRNL
- Jim Jamison, SAIC
- Sam Joh, ANL
- Darrell Lake, INL
- Po-Yung Lu, ORNL



- Lori Manis, ORNL
- Dan Marsick, DOE/HSS-11
- April Martin, WSMS
- Greg Martin, SAIC
- Joan Martin, WSMS
- Lori Martin, WSMS
- Pete Matonis, INL
- Carl Mazzola, Shaw Environmental Inc.
- Yvonne Mescall, Bechtel-Nevada
- Mike O’Keeffe, Bechtel-Nevada
- Katie Panek, ANL
- Rocky Petrocchi, WGI
- Tony Pierpoint, ATL
- Bill Possidente, Bechtel-Nevada
- Jim Powers, NA-41
- Cristy Renner, Portsmouth
- Frank Roberto, INL
- Judith Ryland, ORISE
- Brad Salmonson, INL
- Dina Sassone, LANL
- Dave Stuhan
- Richard Thomas, Intercet
- Tom Tuccinardi, ATL
- Gail Van Gorp, ANL
- Gus Vazquez, EH-41
- Kerry Ward, INL
- Gary Winner, ANL; and,
- Michele Wolfgram (formerly Baker), WSMS

A total of seventy (70) individuals participated in some aspect of the SCAPA program in 2006.

### 3.0 Working Group Accomplishments

#### 3.1 Chemical Exposures WG

The Chemical Exposures WG (CEWG) was involved in four (4) specific projects in 2006. The following summarizes each effort and correlates it to its action item(s):

1. **AI 04-53/05-03:** The EMI-SIG Session, "Effect of SQA Guidance on TEEL and CMM Software", was briefly discussed and it was determined to delay it until the 2007 EMI SIG meeting in San Antonio, TX. Details of the sessions will emerge after the TEEL SQA effort and updated TEEL Documentation and Database document are completed;
2. **AI 05-09:** The development of the TEEL Documentation and Database document progressed. The first draft was issued in March and received more than 1,400 comments. A second draft of the TEEL Documentation and Database document was issued in October for comments. The publication target is January 2007;
3. **AI 05-10:** 360 new chemicals had TEELs developed and the quality assurance has been completed. TEELs Revision 22 will be issued in February 2007 after the 2006 AEGLs and ERPGs have been finalized. This will increase the total number of chemicals with TEELs to 3,305. Work on TEELs Revision 23 will begin in March 2007; and,
4. **AI 06-16:** There was a request for columns for National Fire Protection Association (NFPA) codes, dispersibility, and vapor pressure at 25 degrees Centigrade; which are screening criteria, to be included in the TEELs Revision 22 publication to assist the NNSA/DOE sites in its hazards screening work. Although no commitment to do this with respect to the TEELs Revision 22 effort, ATL was contacted to determine what it would take to include this information in the searchable TEELs data base.

#### 3.2 Chemical Mixtures WG

The Chemical Mixtures WG (CMWG) was involved in eight (8) specific projects in 2006. The following summarizes each effort and correlates it to its action item(s):

1. **AI 04-23:** The Chemical Mixture Methodology (CMM) HCN development for TEELs Revision 20 reached its 50% completion level, and the QA on these completed HCNs has begun. The HCN effort for TEELs Revision 21 and TEELs Revision 22 will follow the completion of the TEELs Revision 20 work;
2. **AI 04-44:** The HCN methodology technical paper continues to be developed, and when completed, will be published in the *Journal of Applied Toxicology*, or other peer-reviewed journal. A draft for SCAPA review is expected in 2007;

3. **AI 04-48/AI 06-15:** Changes to the CMM HCN development procedure are under development to incorporate new acute HCNs for one of the target organs. After these are implemented, the current 2,234 HCN-developed chemicals in TEELs Revision 19 that are affected by these new acute HCNs will be reviewed in the database references to determine if a chronic HCN was used as surrogate for an acute effect. Revision will be accomplished as needed. At the same time, older HCN 4.00 chemicals having similar issues will be reviewed and revised. Work will be initiated after AI 04-23 is completed;
4. **AI 06-07:** NA-41 directed SCAPA to address the following issue: *“The mixture methodology is being applied to source terms involving the release of dissimilar materials from separate and multiple containers. The basic assumption, in order to apply the mixture methodology, is that the materials are released simultaneously, and a plume is formed that represents a mixture of the materials. This is a very conservative assumption, but may be the only one that will yield consequence estimates. It is very important that the limits on the application of this methodology be addressed; assuming, of course, that any exist. Also, in a practical sense, how should the results of the mixture methodology best be used in emergency planning?”* A response was developed which is under NA-41 review;
5. **AI 06-09:** At the EMI SIG CEWG/CMWG meeting, the need for the development of a standard hazards rating index was discussed and a small working group was established to address the issue. NFPA 704 was compared with SAX and several other hazard rating systems and significant differences were determined. An FAQ is under development;
6. **AI 06-10:** At the EMI SIG CEWG/CMWG meeting, there was discussion that the CMM is not being used by safety analysts in their Documented Safety Analyses (DSAs), which is a non-conservative practice. This practice will cause a significant disconnect with Emergency Planning (EP), as EP begins to implement the CMM and finds chemical mixture release scenarios with significant consequences whereas SA will not. Discussions began with the Energy Facility Contractor Group (EFCOG) Chemical Safety Topical Committee (CSTC) and DOE/HSS-21 to close the gap. Carl Mazzola has discussed this with Dick Englehart, DOE/HSS-21, who is on the DOE STD-1189 working group. This standard, which addresses design criteria for chemical hazards, may include the CMM;
7. **AI 06-13:** Revisions to CMM HCN development procedure to account for new acute HCNs and subsequent HCN development for new chemicals was initiated and completed; and,
8. **AI 06-14:** Revision to the automated CMM Excel workbook to include the expanded list of acute HCNs was initiated. Appropriate SQA review needs to be performed before the revised file on the SCAPA website will be filed.

### 3.3 Consequence Assessment Modeling WG

The Consequence Assessment Modeling WG (CAMWG) was involved in eleven (11) specific projects in 2006. The following summarizes each effort and correlates it to its action item(s):

1. **AI 03-08:** NARAC technical basis documents to support future DOE/NNSA consequence assessment modeling efforts are still being compiled and will be provided to DOE/NNSA site emergency managers when they are complete;
2. **AI 04-39:** A list of “beyond-the-DOE/EH-modeling-toolbox” and NARAC user group issues were discussed at the EMI SIG CAMWG meeting and at a special EMI SIG Session on SQA;
3. **AI 05-01:** Support was requested to resolve the TEEL values for UF<sub>6</sub> and its hydrolysis products of UO<sub>2</sub>F<sub>2</sub> and HF. A White Paper was developed and a paper was presented at the ANS 9<sup>th</sup> Topical Meeting on EP & R. HGSYSTEM-UF<sub>6</sub>, modeling for the Portsmouth site benefited from this effort, and the Portsmouth Emergency Manager expressed satisfaction with the SCAPA support;
4. **AI 05-04/06-01:** The toolbox effort was fully integrated with the DOE/EH Central Toolbox Registry, and DOE Order 414.1C and DOE Guide 414.1-4 were issued in June 2005. Hanford, as well as Central Toolbox Registry, has determined that Level B is applicable to EP & R consequence assessment and EPA codes. An SQA self-assessment strategy and a listing of candidate toolbox models were discussed at a special EMI SIG Session on SQA;
5. **AI 05-05:** At the 2005 EMI SIG NARAC User Group meeting, it was suggested that NARAC ingest ARCON96 to provide the capability of calculating radiological and chemical impacts at distances as close as 10 meters from the release point. NARAC has received information on ARCON96 from SCAPA and is moving forward in conjunction with another project;
6. **AI 05-06:** Position paper and support request templates were developed and approved by NA-41;
7. **AI 05-07:** A need to determine whether ICRP-30, ICRP-68/72, and ICRP-90 Dose Conversion Factors (DCFs) are applicable to EPHAs and consequence assessment models was identified. SCAPA developed a position and EH-52 concurrence was obtained to have all DOE/NNSA sites use the ICRP-68/72 dosimetry, which is also being adopted by the Environmental Protection Agency (EPA) in its latest draft Protective Action Guides (PAG). A White paper is being developed and will be issued in early 2007;

8. **AI 05-08:** Seven SCAPA-led sessions occurred during the February 12-15, 2006 ANS EP & R Topical Meeting. Several SCAPA WGs assisted with the abstract and full paper reviews and in chairing the technical sessions;
9. **AI 06-02:** It was determined that the NARAC code is being used for EPHA applications and may contain non-conservatism relative to 95% meteorological condition. NA-41 directed SCAPA to determine effect of using NARAC for Emergency Preparedness Hazard Assessments (EPHAs) and to quantify possible non-conservatism. NARAC was requested to provide additional documentation and training to its users. NARAC representatives acknowledged that for stable low wind speed conditions, NARAC gives more accurate, **but less conservative**, X/Q values and therefore should not be used for EPHAs. NARAC *iClient* documentation makes this disclaimer. DOE/NNSA sites will be encouraged to not use NARAC for EPHA preparation through a NA-41 memorandum;
10. **AI 06-04:** Planning for the EMI SIG Working Group meetings, SCAPA sessions in the EMI SIG meeting, and the SCAPA meeting was initiated and completed; and,
11. **AI 06-11:** At the EMI SIG CAMWG meeting, the WG was asked to assist SNL-NM in benchmarking its Consequence Assessment Team (CAT). A questionnaire was developed to be used in the benchmarking and 12 responses have been received.

### 3.4 Biosafety WG

The Biosafety WG (BWG) was involved in four (4) specific projects in 2006. The following summarizes each effort and correlates it to its action item(s):

1. **AI 06-03:** Periodic BWG teleconferences were initiated and continue;
2. **AI 06-06:** NA-41 directed SCAPA to address the following issue: *“The transport and dispersion of biological agents/toxins released from DOE/NNSA biosafety facilities was left an open subject in the BioEMG. What models are available and appropriate for predictions, especially for lab size source terms, and NOT production quantities? What are the limits to the use of Gaussian models? What other modeling tools are available or being developed? Because a level of severity will likely not be available for defining a Protective Action Criterion (PAC), how will modeling results best be used?”* This issue was discussed at an EMI SIG BWG meeting. NA-41 has stated the importance of this task to fill a gap in the Biosafety EMG. Work has been initiated and ID<sub>50</sub> values from the Army Blue Book and the CDC website appear to be good starting points;
3. **AI 06-08:** A draft BWG charter was developed; and,
4. **AI 06-17:** At a November teleconference, the SCAPA BWG indicated it would interface with DOE/EFCOG CSTC on various nanotechnology-related tasks. The BWG will discuss in its next conference call.

### 3.5 Source Term WG

A fifth SCAPA WG, the Source Term WG (STWG), was rejuvenated in 2006 after nine (9) years of dormancy. The STWG was involved in two (2) specific projects in 2006. The following summarizes each effort and correlates it to its action item(s):

1. **AI 06-05:** At a February SCAPA Teleconference it was decided to reconstitute the STWG, which last met in 1997. The working group is being populated and a web page has been developed. A STWG teleconference in December 2006 was attended by 33 individuals, and highlights of that teleconference was developed; and,
2. **AI 06-12:** At the EMI SIG STWG meeting, there was discussion that there is a lot of source term information in the literature and various sites were doing source term work, but none of it was shared or in an easily accessible document. A STWG was started. Working group members will provide copies or references to key source term documents that can be shared with other SCAPA members, and these documents and references will be posted on the SCAPA website. A mechanism to ask the working group source term questions will be set up on the SCAPA website.

The five (5) SCAPA WGs were involved in a total of twenty-nine (29) projects in 2006.

#### **4.0 Web Page**

The SCAPA webpage continues to be a living document, reflecting the work of SCAPA that its members are conducting. A substantial number of improvements and updates were made to the SCAPA website on a regular basis throughout 2006. These included:

- Modifications to the SCAPA main page;
- Modifications to the *SCAPA News* webpage;
- Modifications to the TEEL webpage;
- Modifications to the DMCC webpage;
- Development of a STWG webpage; and,
- Revisions to the SCAPA contact list and updates to the reference link webpage.

## 5.0 Action Items

On January 1, 2006, there were 13 open SCAPA action items. The following shows the progress on each of these antecedent action items during 2006:

| AI No. | Description  | 1/1/06 Status  | 12/31/06 Status   |
|--------|--|--|---|
| 03-08  | Acquire NARAC technical basis documents to support future DOE/NNSA CA modeling efforts | John Nasstrom, LLNL, contacted 1/7/04. Provided list of NARAC papers in late January. Need to decide if list is complete and forward to SCAPA membership through web page. Awaiting publication of NARAC technical documents.  | Publication of NARAC technical documents pending. NARAC web page does have some links that are useful.  |
| 04-23  | HCNs for Revision 20 TEELs   | 285 new TEELs Rev. 20 chemicals added to Automated CMM workbook HCN-TEEL look-up table. HCNs can be added as developed. Priority of revision of older HCN 4.00 chemicals has been placed after Revision 20 HCN development. Revision 21 HCNs will be developed afterwards. | TEELs Revision 20 HCN effort is 50% complete. QA on completed HCNs has commenced.   |
| 04-39  | Firm up consequence assessment issues for CAM WG                                       | Beyond toolbox and NARAC user group issues has been proposed. Will become more active once the SQA effort moves forward.   | SCAPA toolbox and NARAC User Group issues discussed at the EMI SIG CAMWG meeting and EMI SIG Session on SQA.                                  |
| 04-44  | Development of a HCN methodology technical paper                                       | Publication expected in <i>Journal of Applied Toxicology</i> . First draft is being prepared and will undergo peer review.   | Submission to <i>Journal of Applied Toxicology</i> for publication. Draft for SCAPA review by early 2007.                                     |
| 04-53  | EMI SIG Session on Effect of SQA Guidance on TEEL and HCN software                     | Session delayed until at least 2006 EMI SIG meeting.   | Session delayed until 2007 EMI SIG meeting. Details to emerge after TEEL SQA effort and updated TEEL methodology documentation are completed. |



| AI No. | Description                                   | 1/1/06 Status   | 12/31/06 Status  |
|--------|---|---|--|
| 05-01  | UF <sub>6</sub> Hydrolysis and TEELs          | Modeling issue with toxicology overtones, complicated by the hydrolysis reaction of uranium hexafluoride into uranyl fluoride and has developed a draft hydrofluoric acid. Jamison White Paper and will develop full paper for ANS 9 <sup>th</sup> Topical Meeting on EP & R. HGSYSTEM-UF <sub>6</sub> , RASCAL, ALOHA and EPICODE modeling by Martin and Baker continuing, but will not be part of Jamison paper. Portsmouth requesting analysis to be completed by December 31, 2005. | Jim Jamison has developed a White Paper and presented a paper at the ANS 9 <sup>th</sup> Topical Meeting on Emergency Preparedness & Response. HGSYSTEM-UF <sub>6</sub> , modeling by Amber Martin and Michele Baker benefited from this effort. The Portsmouth Emergency Manager was pleased with the effort and the SCAPA support. <b>(CLOSED)</b> |
| 05-03  | SQA Plan for TEEL and CMM Software            | PNNL summer intern developed a report that concluded code is executing properly. SCAPA has discussed report. There still is a need for a software custodian, procedure for updating, and other documentation.   | PNNL summer intern report concluded code executing properly. Software custodian, a procedure for updating and other SQA documentation are still outstanding.   |
| 05-04  | Candidate Toolbox Models for Central Registry | DOE O 414.1C and DOE G 414.1-1 issued and registry videoconferences to rollout order requirements held. Hanford, as well as Central Toolbox Registry, has determined Level B is applicable to EP & R codes. DOE/NNSA SQA self assessments and candidate toolbox models to be identified by April 2006.  | Cliff Glantz presented the candidate toolbox models at the EMI SIG meeting. HOTSPOT is being evaluated as the 8 <sup>th</sup> toolbox model. <b>(CLOSED)</b>   |
| 05-05  | NARAC Ingestion of ARCON96                    | NA-41 confirmed the merits of this task on 5/3/05 at the SCAPA Program Review Meeting. NARAC has not provided any feedback yet although its representatives appeared to support the concept.  | NARAC has received information on ARCON96 and is moving forward in conjunction with another project.   |

| <b>AI No.</b> | <b>Description</b>   | <b>1/1/06 Status</b>   | <b>12/31/06 Status</b>   |
|---------------|--|--|--|
| 05-06         | Implementation of SCAPA Position Paper and SCAPA Support Templates | Position paper and support request templates sent to NA-41 for review on May 10, 2005.   | NA-41 approved templates. <b>(CLOSED)</b>  |
| 05-07         | Uniform DCFs   | Wayne Davis drafted a statement of problem and will be presenting a paper at the ANS 9 <sup>th</sup> Topical Meeting on EP & R. Strong DOE/NNSA-wide interest in the issue.  | Strong DOE/NNSA-wide interest. EH-52 concurrence received. EPA using ICRP 68/72. White paper to be issued shortly.   |
| 05-08         | 9 <sup>th</sup> Topical Meeting on EP & R                          | Seven SCAPA-led sessions will occur during February 12-15, 2006 Topical Meeting. Full papers are under review.   | Six SCAPA-led sessions occurred during Topical Meeting which was very successful. <b>(CLOSED)</b>  |
| 05-09         | TEEL Documentation and Database                                    | Development of TEEL methodology and use of TEELs progressing. Drafts of Sections 2 (Risk Management), 3 (TEEL Methodology), and 4 (Review Process) have been reviewed. First draft of entire document targeted for 11/15/05. | Second draft TEEL Documentation and Database document issued for comments. Publication target is January 2007.   |
| 05-10         | TEELs Revision 22 Development                                      | TEEL Revision 22 development was in its early stages.  | 360 new chemicals had TEELs developed and the quality assurance has been completed. TEELs Revision 22 will be issued in January 2007 after the 2006 AEGLs and ERPGs have been finalized. This will increase the total number of chemicals with TEELs to 3,305. |

Four (4) of the antecedent action items were satisfied and closed in 2006 (i.e., 05-01, 05-04, 05-06, and 05-08), leaving ten (10) remaining action items (i.e., 03-08, 04-23, 04-39, 04-44, 04-53, 05-03, 05-05, 05-07, 05-09 and 05-10) that are being carried into 2007.

Seventeen (17) new SCAPA action items were opened in 2006. The following shows the status of the 2006 action items:

| <b>AI No.</b> | <b>Description</b>  | <b>12/31/06 Status</b>   |
|---------------|---|--|
| 06-01         | Central Registry SQA and Toolbox Implementation                 | NARAC, ARCON96, 2DPUF, APGEMS, CAP88PC, and RASCAL are SCAPA Toolbox candidates. SCAPA Toolbox will require a graded level of SQA. SCAPA web page updated to include SQA web page and links. Moving forward with HOTSPOT as candidate 8 <sup>th</sup> toolbox model. HOTSPOT decision by January 2007.   |
| 06-02         | NARAC Code Application for EPHAs                                | NARAC representatives acknowledged that for stable low wind speed conditions, NARAC gives more accurate, but less conservative, X/Q values and therefore should not be used for EPHAs. NARAC <i>iClient</i> documentation makes this disclaimer. DOE/NNSA sites will be encouraged to not use NARAC for EPHA preparation through a NA-41 memorandum. |
| 06-03         | Biosafety Working Group Teleconferences                         | First teleconference occurred on December 8, 2005. Jim Powers discussed the draft Biosafety EMG with the working group and plans to develop a BWG Charter were initiated, Subsequent teleconferences have taken place. <b>(CLOSED)</b>   |
| 06-04         | EMI SIG-SCAPA 2006  | Planning for the EMI SIG Working Group meetings, SCAPA sessions in the EMI SIG meeting, and the SCAPA meeting was completed. <b>(CLOSED)</b>   |
| 06-05         | Source Term Working Group                                       | Productive STWG meeting took place at 2006 EMI SIG Meeting. Several source-term related issues will be addressed. Working group is being populated and first teleconference occurred in November 2006.   |
| 06-06         | Transport and Dispersion of Biological Agents/Toxins for BioEMG | Issue discussed at BWG meeting at EMI SIG. NA-41 has stated the importance of this task to fill a gap in the Biosafety EMG. Work has been initiated and ID <sub>50</sub> values from Army Blue Book and the CDC website appear to be good starting points.   |
| 06-07         | Use of mixture methodology results in emergency planning        | A response was provided which is under NA-41 review.   |
| 06-08         | Develop Biosafety WG Charter                                    | A draft charter is being sent to NA-41 for approval.   |
| 06-09         | Standardization of Hazard Ratings                               | NFPA 704 has been compared with SAX and significant differences have been determined. Comparison with other hazards rating indices has been completed. An FAQ will be written.   |
| 06-10         | Use of CMM by safety analysts                                   | SCAPA to work with Energy Facility Contractor Group (EFCOG) Chemical Safety Topical Committee (CSTC) to close gap. Discussed with Dick Englehart, DOE/HSS-21.  |
| 06-11         | Benchmarking Consequence Assessment Team (CAT)                  | Benchmarking program information will be provided. SNL has developed questionnaire to be used to supplement benchmarking work. Questionnaire has been sent out to DOE/NNSA sites and some responses have been received.  |
| 06-12         | Source Term Compendium  | Initial work has begun.  |

| <b>AI No.</b> | <b>Description</b>   | <b>12/31/06 Status</b>   |
|---------------|--|--|
| 06-13         | Revisions to CMM HCN development procedure to Account for New Acute HCNs and subsequent HCN development for new chemicals. | Work has been completed. <b>(CLOSED)</b>   |
| 06-14         | Revisions to CMM require revisions to the CMM Excel file software.   | Initial work has begun.  |
| 06-15         | Revisions to Existing HCNs using Revised CMM HCN development procedure   | Work will be initiated after AI 04-23 is complete.   |
| 06-16         | Additional information in TEEL documents and databases   | Although no commitment to do this with respect to the TEELs Revision 22 effort, ATL was contacted to determine what it would take to include this information in searchable TEELs data base. |
| 06-17         | Interface with DOE nanotechnology initiative   | BWG will discuss its next conference call.   |

Three (3) of the 2006 action items were satisfied and closed in 2006 (i.e., 06-03, 06-04, and 06-13), leaving fourteen (14) 2006 action items that will be carried into 2007.

On December 31, 2006, twenty-four (24) action items were still open. This includes one (1) action item from 2003, four (4) action items from 2004, four (4) action items from 2005, and fourteen (14) action items from 2006.

## **6.0 2007 Activities and Priorities**

Prioritization of the following projects and activities will be solely based on NA-41 guidance at the biannual SCAPA program meetings, and at other meetings and teleconferences with SCAPA leadership.

### **6.1 Chemical Exposures WG**

The Chemical Exposures WG activities for 2007 are as follows:

1. Complete Revision 22 TEELs, post them on the SCAPA web page and include this information in the searchable TEELs data base;
2. Begin development of Revision 23 TEELs on new chemicals submitted by DOE/NNSA sites;
3. Undertake full SQA effort on TEEL methodology macros and develop all documentation identified in DOE G 414.1-4. Establish a software custodian and develop a procedure for updating the macros;
4. Complete TEEL Documentation and Database document effort and place report on website;
5. Continue to track the progress of the ERPGs and AEGLs and integrate developments into TEEL Revision 23 work activity;
6. Work with ATL to place NFPA codes, dispersibility, and vapor pressure at 25 degrees Centigrade in the searchable TEELs data base; and,
7. Address emerging chemical exposure technical projects, as appropriate.

### **6.2 Chemical Mixtures WG**

The Chemical Mixtures WG activities for 2007 are as follows:

1. Complete Revision 20 HCNs and post them on the SCAPA web page;
2. Begin development of Revision 21 HCNs and post them on the SCAPA web page;
3. Begin development of Revision 22 HCNs and post them on the SCAPA web page;
4. Complete HCN Methodology technical paper and publish it in an appropriate journal;

5. Undertake full SQA effort on HCN methodology and develop all documentation identified in DOE G 414.1-4. Establish a software custodian and develop a procedure for updating the macros;
6. Revise TEEL Revision 19 HCNs to incorporate acute HCNs, as appropriate;
7. Complete response to NA-41 issue on the limits of the CMM and how its result should best be used in emergency planning;
8. Complete the FAQ on the comparison of hazards rating indices;
9. Continue discussions with safety analysts on the use of the CMM; and,
10. Address emerging chemical mixture technical projects, as appropriate.

### **6.3 Consequence Assessment Modeling WG**

The Consequence Assessment Modeling WG activities for 2007 are as follows:

1. Distribute NARAC technical basis documents to DOE/NNSA sites once they are received;
2. Continue to establish CAMWG priorities;
3. Refine the DOE/NNSA SQA self-assessment strategy and candidate toolbox models;
4. Oversee the process of establishing new toolbox codes and interface with the DOE/EH Central Toolbox Registry, as appropriate;
5. Interface with NARAC through its advisory group and assist it with its issue resolution and its relationship with SCAPA, as appropriate;
6. Track the progress of the revised EPA PAGs, and DHS Protective Action Levels (PALs);
7. Oversee NARAC ingestion of the ARCON96 code;
8. Issue White Paper on DCFs;
9. Develop sessions for the 10<sup>th</sup> EP & R Topical Meeting which will be held in Albuquerque, NM in March 2008;
10. Ensure that NARAC will not be used for EPHAs;
11. Plan and execute the 2007 EMI SIG, DMCC, and SCAPA meetings;

12. Complete the benchmarking of the SNL-NM CAT;
13. Interface with the DMCC; and,
14. Address emerging consequence assessment modeling projects, as appropriate.

#### **6.4 Biosafety WG**

The Biosafety WG activities for 2007 are as follows:

1. Continue periodic BWG teleconferences that will mature its work;
2. Continue BWG involvement in SCAPA and EMI SIG meetings; and,
3. Develop a response to NA-41 issue on the limits of Gaussian models relative to the transport and dispersion of bioagents and bioweapons;
4. Complete and issue the BWG Charter;
5. Interface, as appropriate with DOE nanotechnology initiatives; and,
6. Address emerging biosafety projects, as appropriate.

#### **6.5 Source Term WG**

The Source Term WG activities for 2007 are as follows:

1. Complete the population of the STWG and conduct periodic teleconferences;
2. Initiate work on the source term compendium; and,
3. Address emerging source term projects, as appropriate.

#### **6.6 Web Page**

SCAPA webpage activities for 2007 will include:

1. Update the *Consequence Assessment Modeling Toolbox* webpage;
2. Update the *TEELs* and *CMM* webpages; and,
3. Modification and enhancement to the *SCAPA News* webpage; and,
4. Improvements and maintenance to all 5 working group web pages.

## **7.0 Conclusion**

The SCAPA program had yet another active and successful year in 2006. A well-attended and broad-based SCAPA Meeting was held on May 4 in Las Vegas, NV, and seven teleconferences were held throughout the year to maintain continuity of all 29 active SCAPA projects. Seventy individuals participated in some form in the program and a new source term WG was added; making five WGs in total. All NNSA/DOE sites appear to be showing strong interest in the SCAPA programs, as evidenced by the number of individuals attending the SCAPA meeting and the teleconferences.

There are reasonable strong expectations for an even more productive year in 2007. The first teleconference has been scheduled for January 16, 2007 and the SCAPA Meeting has been scheduled for May 10-11, 2007 in San Antonio, TX. There will be meetings of each SCAPA WG and the NARAC User Group at the EMI SIG Meeting and several special SCAPA sessions have been submitted to the EMI SIG Steering Committee.



## 8.0 ACRONYMS

The following is a list of acronyms used in this report:

### A

|       |  |
|-------|--|
| AEGL  | Acute Exposure Guideline Level               |
| ALOHA | An atmospheric transport and dispersion code |
| ANS   | American Nuclear Society                     |
| ANL   | Argonne National Laboratory                  |
| ATL   | Advanced Technology Laboratories             |
| ARCON | Atmospheric Relative CONcentrations          |

### B

|     |                                |
|-----|--------------------------------|
| BNL | Brookhaven National Laboratory |
| BWG | Biosafety Working Group        |

### C

|       |   |
|-------|---|
| CA    | California, Consequence Assessment            |
| CAMWG | Consequence Assessment Modeling Working Group |
| CAT   | Consequence Assessment Team                   |
| CDC   | Centers for Disease Control                   |
| CEWG  | Chemical Exposure Working Group               |
| CEMS  | Comprehensive Emergency Management System     |
| CMM   | Chemical Mixture Methodology                  |
| CMWG  | Chemical Mixtures Working Group               |
| CSTC  | Chemical Safety Topical Committee             |

### D

|         |   |
|---------|---|
| DC      | District of Columbia                          |
| DCF     | Dose Conversion Factor                        |
| DMCC    | DOE Meteorological Coordinating Council       |
| DOE     | Department of Energy                          |
| DOE/EH  | DOE Office of Environmental Safety and Health |
| DOE/HSS | DOE Office of Health Safety and Security      |

**E**

|         |  |
|---------|--|
| EFCOG   | Energy Facility Contractor Group                   |
| EMG     | Emergency Management Guide                         |
| EMI SIG | Emergency Management Issues Special Interest Group |
| EOC     | Emergency Operations Center                        |
| EP      | Emergency Planning                                 |
| EPHA    | Emergency Preparedness Hazard Assessment           |
| EPICODE | An atmospheric transport and dispersion code       |
| EP & R  | Emergency Preparedness & Response                  |
| ERPG    | Emergency Response Planning Guideline              |

**F**

|     |                           |
|-----|---------------------------|
| FAQ | Frequently Asked Question |
| FY  | Fiscal Year               |

**G**

|   |       |
|---|-------|
| G | Guide |
|---|-------|

**H**

|                          |  |
|--------------------------|--|
| HCN                      | Health Code Number                           |
| HGSYSTEM-UF <sub>6</sub> | An atmospheric transport and dispersion code |
| HOTSPOT                  | An atmospheric transport and dispersion code |

**I**

|                  |   |
|------------------|---|
| ICRP             | International Council on Radiation Protection |
| ID <sub>50</sub> | Infectious Dose for 50 % of the population    |
| INL              | Idaho National Laboratory                     |

**J**

**K**

**L**

|      |  |
|------|--|
| LA   | Louisiana                              |
| LANL | Los Alamos National Laboratory         |
| LLNL | Lawrence Livermore National Laboratory |

**M**

|       |                           |
|-------|---------------------------|
| M & O | Management and Operations |
|-------|---------------------------|

**N**

|       |   |
|-------|---|
| NA-41 | DOE Office of Emergency Management              |
| NARAC | National Atmospheric Release Advisory Center    |
| NFPA  | National Fire Protection Association            |
| NM    | New Mexico                                      |
| NNSA  | National Nuclear Security Administration        |
| NOAA  | National Oceanic and Atmospheric Administration |
| NV    | Nevada  |

**O**

|       |   |
|-------|---|
| O     | Order   |
| OEM   | Office of Emergency Management                |
| ORISE | Oak Ridge Institute for Science and Education |
| ORNL  | Oak Ridge National Laboratory                 |
| OROO  | Oak Ridge Operations Office                   |
| OST   | Office of Safe Transport                      |

**P**

|      |                                       |
|------|---------------------------------------|
| PA   | Protective Actions                    |
| PAC  | Protective Action Criterion           |
| PAG  | Protective Action Guide               |
| PAL  | Protective Action Level               |
| PNNL | Pacific Northwest National Laboratory |

**Q**

**R**

|        |  |
|--------|--|
| RASCAL | An atmospheric transport and dispersion code |
|--------|--|

**S**

|       |   |
|-------|---|
| SA    | Safety Analyst  |
| SAIC  | Science Applications International Corporation                |
| SC    | South Carolina  |
| SCAPA | Subcommittee on Consequence Assessment and Protective Actions |
| SEI   | Shae Environmental Incorporated                               |
| SNL   | Sandia National Laboratory                                    |
| SQA   | Software Quality Assurance                                    |
| SRNL  | Savannah River National Laboratory                            |
| SROO  | Savannah River Operations Office                              |
| SRS   | Savannah River Site   |
| STD   | Standard  |
| STWG  | Source Term Working Group                                     |

**T**

|       |                                     |
|-------|-------------------------------------|
| TAG   | TEEL Advisory Group                 |
| TEEL  | Temporary Emergency Exposure Limit  |
| TRADE | Training Resource and Data Exchange |
| TX    | Texas                               |

**U**

|     |                            |
|-----|----------------------------|
| URL | Universal Resource Locator |
|-----|----------------------------|

**V**

**W**

|      |  |
|------|--|
| WG   | Working Group                          |
| WGI  | Washington Group International         |
| WSMS | Washington Safety Management Solutions |
| WSRC | Westinghouse Savannah River Company    |

**X**

**Y**

**Z**